

## SURE-SCREEN<sup>®</sup>

SURE-SCREEN<sup>®</sup> is a rapid qualitative screening test for detection of multiple drugs and drug metabolites in human urine.

The Lateral Flow (LatFlo<sup>®</sup>) Adulterant Strip (LFAS) is a rapid qualitative screening assay for the detection of Oxidants and Nitrites and the determination of Specific Gravity and pH values in human urine. It is used to evaluate specimens for adulteration prior to Drugs of Abuse urine (DAU) testing.

**The SURE-SCREEN device is only for Forensic/Toxicology use and not for in vitro diagnostic applications.**

### 1. INTENDED USE

The SURE-SCREEN Drugs of Abuse Test System uses immunochromatographic test strips for the rapid, qualitative detection of one or more of the following: Amphetamine, Barbiturates, Buprenorphine, Benzodiazepines, Cocaine, Methamphetamine, Methadone, Opiates, Oxycodone, Phencyclidine, Propoxyphene, and THC (Cannabinoids) in human urine. This product is for forensic/toxicology use only.

SURE-SCREEN detects drug classes at the following cutoff concentrations:

AMP	Amphetamine (d-Amphetamine)	300 ng/mL
BAR	Barbiturates (Butalbital)	200 ng/mL
BUP	Buprenorphine	10 ng/mL
BZO	Benzodiazepines (Nordiazepam)	200 ng/mL
COC	Cocaine (Benzoylecgonine)	100 ng/mL
MAMP	Methamphetamine (d-Methamphetamine)	1000 ng/mL
MTD	Methadone (Methadone)	200 ng/mL
OPI	Opiates (Morphine)	100 ng/mL
OXY	Oxycodone	100 ng/mL
PCP	Phencyclidine (Phencyclidine)	25 ng/mL
PPX	Propoxyphene (Norpropoxyphene)	300 ng/mL
THC	Cannabinoids (11-nor-9-carboxy- $\Delta^9$ -THC)	40 ng/mL

Many of the cutoff concentrations for these tests are below those recommended by SAMHSA. Additionally, many of these tests are positive at levels significantly below the claimed cutoff concentration. The rate of false positive results with tests having sensitivities this low has not been studied. However, the rate of false positives generally increases as the cutoff concentration of the test is lowered. See the Precision/Sensitivity section for more information.

**The SURE-SCREEN drugs of abuse test system provides only a preliminary analytical test result. A more specific alternate chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) or liquid chromatography/tandem mass spectrometry (LC/MS/MS) is the preferred confirmatory method. Clinical consideration and professional judgment should be applied to any drug of abuse test result.**

### 2. SUMMARY AND EXPLANATION OF THE TEST

The qualitative SURE-SCREEN Drugs of Abuse Test System utilizes a solid phase immunoassay technology to provide a very rapid test requiring no instrumentation. This test may be used to screen human urine samples for one or more of the following drug classes prior to confirmatory testing:

Amphetamines (AMP) are central nervous system stimulants. This group of compounds includes amphetamine, methamphetamine, and related designer drugs like MDMA (Ecstasy).

Barbiturates (BAR) are a group of structurally related prescription drugs that are used to reduce restlessness and emotional tension, induce sleep and to treat certain convulsive disorders.

Buprenorphine (BUP) is a potent analgesic often used in the treatment of opiate abusers.

Benzodiazepines (BZO), a group of structurally related central nervous system depressants, are primarily used to reduce anxiety and induce sleep.

Cocaine (COC) is a central nervous system stimulant. Its primary metabolite is benzoylecgonine.

Methamphetamine (MAMP) is a central nervous system stimulant (see Amphetamine).

Methadone (MTD) is a synthetic opioid used clinically as a maintenance drug for opiate abusers and for pain management.

Opiates (OPI) are a class of natural and semi-synthetic drugs that include morphine, codeine and heroin.

Oxycodone (OXY) (Oxycontin<sup>®</sup>, Percodan, Percocet) is a semi synthetic narcotic analgesic that is prescribed for moderately severe pain. It is available in both standard and sustained release oral formulations. Oxycodone is metabolized to Oxymorphone and Noroxycodone.

Phencyclidine (PCP) is a hallucinogenic drug.

Propoxyphene (PPX) is a narcotic analgesic. Its primary metabolite is norpropoxyphene.

Marijuana (THC) is a hallucinogenic agent derived from the hemp plant. Marijuana contains a number of active ingredients collectively known as Cannabinoids.

Many factors influence the length of time required for drugs to be metabolized and excreted in the urine. A variety of factors influence the time period during which drugs are detected; the rate of urine production, the volume of fluid consumption, the amount of drug taken, the urine pH, and the length of time over which drug was consumed. Drinking large volumes of liquid or using diuretics to increase urine volume lowers the drug concentration and decreases the detection period. Although the detection period for these drugs varies widely depending upon the compound taken, dose and route of administration and individual rates of metabolism, some general times have been established and are listed below.

<u>Drug</u>	<u>Detection Period</u>
Amphetamine	
Acid Conditions	1-3 days
Alkaline Condition	3-10 days
Barbiturates	
Short-Acting	up to 6 days
Long-Acting	up to 16 days
Buprenorphine	up to 3 days
Benzodiazepines	1-12 days
Cocaine Metabolite	up to 5 days 1-3 days typical
Methadone	1-3 days
Methamphetamine	
Acid Conditions	1-3 days
Alkaline Conditions	3-10 days

<u>Drug</u>	<u>Detection Period</u>
Opiates	
Heroin	1 day
Morphine	1-3 days
Codeine	1-3 days
Oxycodone	1-3 days
PCP	
Single Use	1-8 days
Chronic Use	up to 4 weeks
Propoxyphene	up to 1 week
THC	
Single Use	1-7 days
Chronic Use	Less than 30 days typical

The LFAS is a lateral flow strip with impregnated reagent test pads that detect specific analytes in human urine. The specific analytes detected are Oxidants and Nitrites. The strip also approximates specific gravity and pH values. The temperature strips on the cup may be used to detect potential adulteration of the sample. Urine samples with "abnormal values" should be submitted to a reference laboratory for additional testing.

**Oxidants** The detection is based on the oxidative activity of compounds (e.g. chromate salts and/or bleach) that catalyze the oxidation of an indicator by an organic hydroperoxide producing a blue/orange color. The color intensity is directly proportional to the concentration of oxidants present in the sample and is observed visually and compared to the color comparator chart to obtain a result.

**Nitrites** The test is based on the principles of the Griess reaction for the detection of Nitrites. The test paper contains an amine and a coupling component. A red/orange colored azo compound is obtained by diazotization and subsequent coupling. The color intensity is directly proportional to the concentration of nitrites present in the sample and is observed visually and compared to the color comparator chart to obtain a result.

**pH** The test paper contains indicators that change colors between pH 2 and pH 11. The color scale gives an approximate indication for pH values between those levels.

**Specific Gravity** The test paper reacts with ions in urine to indicate concentrations from 1.000 to 1.020. The color changes range from dark green with low ionic concentrations through green to yellow/orange in urines with high ionic concentrations. The color is observed visually and compared to the color comparator chart to obtain an approximate result.

### 3. PRINCIPLES OF THE PROCEDURE

The SURE-SCREEN Drugs of Abuse Test System contains a device with rapid, competitive, membrane-based immunochromatographic test strips, a cup and a lid. A single urine sample can be evaluated for the presence of each of the specified classes of drugs in a single device. Each test strip contains antibody colloidal gold, a drug conjugate and a control line.

**ANTIBODY-COLLOIDAL GOLD** -- Mouse monoclonal antibodies were developed specifically targeted to the drugs listed in the Intended Use section. Each antibody only binds drugs from the tested drug classes. Antibody-colloidal gold solutions were prepared by absorbing each of the individual monoclonal antibodies to colloidal gold. The colloidal gold solutions were applied to the sample well pads on the test strip.

**DRUG-CONJUGATES** -- Drug from each tested class was individually conjugated to protein and immobilized as a line on a membrane at the location labeled "T" on the device.

**CONTROL LINE** -- Each test strip has anti-mouse immunoglobulin antibodies immobilized as a line on the membrane at the location labeled "C" on the device. The anti-mouse immunoglobulin antibodies bind the mouse antibodies coated on the colloidal gold.

Drugs in the urine and the drugs conjugated to the protein compete to bind to the antibody-colloidal gold. When the test system cup is tipped over or the dip device is dipped, urine flows into the sample pads of the device, the dried antibody-colloidal gold on the sample pad dissolves and the urine wicks up the white test strips carrying the reddish-purple antibody-colloidal gold with it.

#### Negative Samples

When no drug(s) is present in the urine sample, the red antibody-colloidal gold migrates up the test strip and binds to the drug conjugate immobilized on the membrane. The binding of the antibody-colloidal gold to the drug conjugate generates an easily visible reddish-purple line at the "T" location on the device. Strips with two tests will be labeled with two colors and are on left-hand side of device. The top color will indicate the T1 test with T1= drug test name. The bottom color will indicate the T2 test with T2= drug test name. Strips with only one color will have test results appear at the T1 position. Negative results can be reported as soon as a line is visible.

#### Non-Negative Samples

When a drug is present in the sample the antibody-colloidal gold binds the drug before it migrates up the test strip. However, when the antibody-colloidal gold binds the drug in the urine, the antibody-colloidal gold cannot bind to the drug conjugate immobilized on the test strip. When the drug concentration is at or above the cutoff concentration, the majority of the antibody colloidal gold is bound to the drug from the urine. Therefore, as drug bound antibody-colloidal gold migrates up the test strip, it is unable to bind to the drug conjugate immobilized on the membrane. Therefore no line is generated at the "T" location on the device for a non-negative sample. Read non-negative results at 5 minutes.

#### Control Line

Each test strip has an internal procedural control. A line must form at the control "C" location on the device to indicate that the reagents are migrating properly. If a control line does not form, the test is considered invalid. A control line forms when the antibody-colloidal gold binds to the anti-mouse immunoglobulin antibody immobilized on the membrane as a line at the "C" location on the device.

#### **4. MATERIALS PROVIDED/STORAGE CONDITIONS**

Each SURE-SCREEN Drugs of Abuse Test contains all the reagents necessary to test one urine sample for one or more drugs simultaneously. SURE-SCREEN test devices are available in Cup or Dip format as described below.

##### **Kit Contents – Cup Test format**

The SURE-SCREEN Drugs of Abuse Cup Test kit contains twenty-five (25) test system bags and one reference guide.

Each Cup Test system bag contains:

1. One (1) test device in a foil package.
  1. Each test device has test strips with drug specific reagents.
  2. The test device may contain a membrane strip laminated with Adulterant test pads for testing the presence of Oxidants and Nitrites, as well as determining approximate values of Specific Gravity and pH in human urine. (Products with LFAS test strip only; the LFAS test strip is not contained in every SURE-SCREEN product.)
2. One (1) cup with temperature strip attached.
3. One (1) lid.
4. One (1) security seal.
5. One (1) Color Comparator Chart (products with LFAS test strip only).

##### **Kit Contents – Dip Test format**

The SURE-SCREEN Drugs of Abuse Dip Test Kit contains twenty-five (25) test devices in foil packages and one reference guide.

Each Dip Test device has test strips with drug specific reagents.

##### **Materials Required but not provided**

Timer

A urine collection container is not provided with the Dip device.

Specimen containers, disposable gloves and urine temperature strips are available from MEDTOX Diagnostics, Inc.

##### **Storage Conditions**

The kit, in its original packaging, should be stored at 2-25°C (36-77°F) until the expiration date on the label.

#### **5. PRECAUTIONS**

1. Urine specimens and all materials coming in contact with them should be handled and disposed of as if infectious and capable of transmitting infection. Avoid contact with broken skin.
2. Avoid cross-contamination of urine samples by using a new urine specimen container for each urine sample.
3. The device should remain in its original sealed foil pouch until ready to use. If the pouch is damaged, do not use the test.
4. Do not store the test kit at temperatures above 25°C (77°F).
5. If devices have been stored refrigerated, bring to ambient temperature (18-25°C/ 64-77°F) prior to opening foil pouch.
6. Do not use tests after the expiration date printed on the package label.
7. The drug screen and the LFAS strip are for Forensic/Toxicology use only.

#### **6. SAMPLE COLLECTION AND PREPARATION**

For a Cup Test, collect the urine sample in the provided cup. The urine volume should be between the minimum and maximum volume lines.

For a Dip Test, collect the urine sample in a clean specimen container.

Collection of 45 mL of urine is more than sufficient for testing. No preservatives should be added. Urine may be tested immediately following collection. If it is necessary to store the urine, store under refrigeration at 2 to 8°C (36 to 46°F) for no more than two days. Urine may be frozen at -20°C (-4°F) or colder for storage. Stored urine must be brought to ambient temperature (18 to 25°C/64 to 77°F) and mixed well to assure a homogeneous sample prior to testing.

#### **7. TEST PROCEDURE**

##### **Cup Test**

1. Bring pouched device to room temperature before opening it. Fill urine sample cup between the minimum and maximum volume lines.
2. Screw lid clockwise onto the cup until very tight.
3. Open pouch and label the device with the patient or sample identification.
4. Connect device to lid securely as follows: Hold cup with raised sample port toward you. Hold device cassette with MEDTOX labeled end to your left. Place device cassette on top of cup lid with holes aligned. Rotate the device clockwise ¼ turn until it snaps in place.
5. Tip the cup on its side to start flow (if less than 45 ml of urine, tilt the cup forward to begin flow).
6. If LFAS is present, read pH, Specific Gravity, and Nitrites in vertical position as soon as color changes. Read oxidant at 60 seconds.
7. Allow the test cup to sit on its side for 5 minutes.
8. Turn the test cup upright and read the results. Control line must be present to read results. Negative results can be read as soon as a test line is visible, non-negatives at 5 minutes.

##### **Dip Test**

1. Bring pouched device to room temperature before opening it.
2. Open one pouch for each sample to be tested. Write patient or sample identification information on the device.
3. Pull off the clear cover to expose the fiber pads at ends of test strips.
4. Dip the small end of the cassette into the sample so that only the white ends of the test strips are submerged.
5. Hold the ends of the test strips in the sample until the reddish-purple solution begins to run up all of the strips.
6. Remove the device from sample and replace the cover to protect the wet ends of the test strips.
7. Lay cassette flat, face up for 5 minutes.
8. Read the results. Control line must be present to read results. Negative results can be read as soon as a test line is visible, non-negative at 5 minutes.

**NOTE:** Read results at 5 minutes or within 15 minutes of the sample application. Oxycodone should be read at 5 minutes. Test results interpreted after 15 minutes (for Oxycodone after 5 minutes) may not be consistent with the original results obtained at 5 minutes.

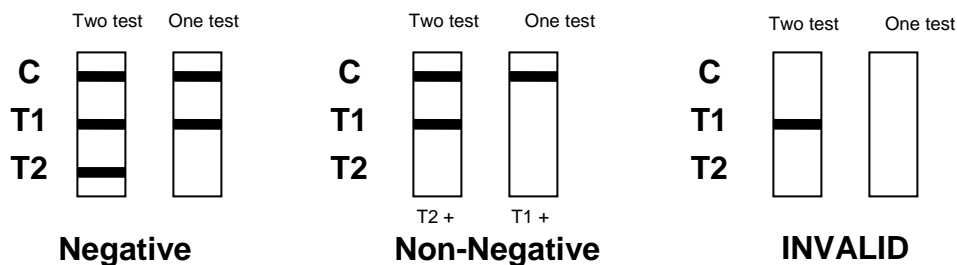
#### **8. READING THE TEST RESULTS**

**Negative:** The appearance of a reddish purple line at both the control area (C) and appropriate test area (T) indicates a negative test result. The color intensities of the control lines (C) and test lines (T) may not be equal and may vary from test to test. The test line and control line positions may vary slightly from test strip to test strip. Any line of reddish-purple color, even of faint intensity, indicates a negative test result.

**Non-Negative:** The appearance of a control line and the absence of a test line indicate a preliminary positive test result for that drug.

**Invalid:** The control line must be present for the test to be valid. The absence of a control line indicates the test is invalid. The urine sample should be retested on a new device.

Examples of Negative, Non-Negative and Invalid results:



There are other possible results depending on the drug or combination of drugs present in the urine sample.

## 9. INTERPRETATION OF TEST RESULTS

A NEGATIVE test result for a specific drug indicates that the sample does not contain the drug/drug metabolite above the cutoff level.

A NON-NEGATIVE test result for a specific drug indicates that the sample may contain drug/drug metabolite near or above the cutoff level. It does not indicate the level of intoxication or the specific concentration of drug in the urine sample. Non-negative samples or those with abnormal LFAS tests should be sent to a reference laboratory for more definitive testing.

### **Understanding the Test Results:**

A non-negative test result does not always mean a person took illegal drugs and a negative test result does not always mean a person did not take illegal drugs. There are a number of factors that influence the reliability of drug tests. Certain drugs of abuse tests are more accurate than others.

## 10. QUALITY CONTROL

An internal procedural control is included on each test strip. A line must form at the control (C) position on the test strip to indicate that adequate sample volume has been added, the reagents migrated properly, and the test strip is intact. If a control line does not form, the test is considered invalid. The control line consists of immobilized anti-mouse antibody that reacts with the antibody-colloidal gold as it passes this region of the membrane. Formation of a visible line verifies the control line antibody antigen reaction occurred. A visible control line should always be present regardless of whether drug is absent or present in the sample. Minimally, a QC program includes external negative and positive control material used to monitor the performance of each new lot of product, each new shipment of product and may be used to assess the competency of new operators.

For additional information concerning QC or forensic testing requirements, contact the appropriate regulatory authority. Users should follow federal, state, and local QC requirements.

## 11. LIMITATIONS OF THE PROCEDURE

1. The SURE-SCREEN Drugs of Abuse Test System is only for use with unadulterated human urine samples.
2. There is a possibility that other substances and/or factors, e.g. technical or procedural errors, may interfere with the test and cause false results.

### **LFAS Strip**

The purpose of the adulteration strip is to screen for abnormal conditions in human urine, such as dilution or the addition of drug-test interfering substances. Occasionally medications may discolor the urine making it difficult to read the result.

#### **Oxidant**

Nitrites acting as oxidizing agents will produce a blue/green color change on the Oxidant Pad.

#### **Nitrite**

Abnormal results can be caused by the presence of diagnostic or therapeutic dyes in the urine. Very high concentrations of oxidant such as 80% bleach will produce a brown color change on the Nitrite pad.

## 12. EXPECTED VALUES

### **SURE-SCREEN TEST SYSTEM:**

SURE-SCREEN Drugs of Abuse Test System qualitatively detects amphetamine, barbiturates, buprenorphine, benzodiazepines, cocaine, methadone, methamphetamine, opiates, oxycodone, phencyclidine, propoxyphene and THC (Cannabinoids) and/or their metabolites in human urine at or above their specified cutoff level. Illicit drugs should never be found in urine, and legal drugs (such as amphetamine, barbiturates, buprenorphine, benzodiazepines, methamphetamine, opiates, oxycodone, propoxyphene or methadone) may appear in the urine for legitimate reasons. Confirmatory test results should be reviewed by a Medical Review Officer for interpretation.

### **LFAS Test:**

Urine that produce an abnormal result on the LFAS adulteration strip should be sent to a reference laboratory for more definitive testing to determine if the urine may be dilute, substituted, invalid and/or adulterated.

## 13. PERFORMANCE CHARACTERISTICS

### **13A. Sensitivity, Accuracy, and Precision**

#### **Accuracy**

The accuracy was evaluated by assaying a panel of blind coded clinical urine samples containing varying concentrations of drugs and comparing to GC/MS or LC/MS/MS results. The samples were obtained from MEDTOX Laboratories. Samples were screened at traditional laboratory cutoff concentrations by a commercial immunoassay system. Samples with negative results by both the commercial immunoassay system and SURE-SCREEN were not confirmed by GC/MS or LC/MS/MS. Samples with positive results by either the commercial immunoassay system or SURE-SCREEN were confirmed by GC/MS or LC/MS/MS. Most samples were unaltered clinical samples. In order to have samples with concentrations close to the cutoff, some samples were diluted with negative urine. The five minute results are shown in the following tables. The testing was performed by MEDTOX personnel.

**ACCURACY COMPARED TO GC/MS OR LC/MS/MS  
(Amphetamine, Barbiturates, Buprenorphine, Benzodiazepines, Cocaine, Methamphetamine, Methadone, Opiates, Oxycodone, Phencyclidine, Propoxyphene, and Cannabinoids (THC))**

<b>5 Minute</b>	Negative by immunoassay; if positive, no drug was detected above the limit of detection of the confirmatory method	Concentration range of up to 50% below the cutoff (ng/mL)	Concentration range between the -50% of the cutoff and the cutoff (ng/mL)	Concentration range between the cutoff and 50% above the cutoff (ng/mL)	Concentration range of greater than 50% above the cutoff (ng/mL)
<b>AMP</b>			180 – 255	334 – 402	474 – 11845
Positive	0	Not performed	4	4	32
Negative	55	Not performed	1	1	1
Samples are categorized according to d-amphetamine concentrations.					
<b>BAR</b>			109 -194	201 - 298	326 - 27776
Positive	0	Not performed	3	12	52
Negative	58	Not performed	5	0	0
Samples contained one of the following barbiturates: Phenobarbital, Butalbital or Pentobarbital. Ten samples were diluted with negative urine to obtain concentrations around cutoff.					
<b>BUP</b>			6-7	13-14	32-50042
Positive	0	Not performed	0	4	40
Negative	42	Not performed	4	0	0
Buprenorphine and Norbuprenorphine added together. Six samples were diluted with negative urine to obtain concentrations around the cutoff (2 above, 4 below).					
<b>BZO</b>			113 - 151	220 - 281	428 - 12491
Positive	0	Not performed	4	5	33
Negative	54	Not performed	0	0	0
Nordiazepam, oxazepam, temazepam, alprazolam and $\alpha$ -hydroxy-alprazolam were added together to determine the total benzodiazepine concentration reported in the table. Six samples were diluted with negative urine to obtain concentrations around the cutoff.					
<b>COC</b>			55 - 91	110 - 140	153 - 96924
Positive	0	Not performed	6	5	36
Negative	54	Not performed	0	0	0
Samples are categorized by benzoylecgonine concentrations (cocaine metabolite).					
<b>MTD</b>			112 - 114	249 - 283	307 - 9411
Positive	0	Not performed	2	6	44
Negative	98	Not performed	2	1	0
<b>OPI</b>			76 – 90	111 – 147	251 – 136360
Positive	0	Not performed	4	4	36
Negative	54	Not performed	0	0	0
Morphine, codeine, hydrocodone and hydromorphone were added together to determine the total opiate concentrations reported in this table.					
<b>OXY</b>		11-44	50-98	101-149	156-164135
Positive	0	5	8	9	125
Negative	106	11	8	2	3
Oxycodone and oxymorphone (weighted as 50%) were added together to determine the total oxycodone concentration reported in the table.					
<b>PCP</b>			13 - 22	27 - 35	39 - 5439
Positive	0	Not performed	2	5	33
Negative	55	Not performed	3	0	0
<b>PPX</b>			150-265	339-450	>472
Positive	0	Not performed	4	6	73
Negative	60	Not performed	4	1	1
Eight samples were diluted with negative urine to obtain concentrations around the cutoff.					
<b>THC</b>		3	21 - 37	42 - 54	62 - 761
Positive	0	0	5	8	34
Negative	55	1	1	0	0
11-nor-9-carboxy- $\Delta^9$ -THC concentrations are reported in this table.					

GC/MS Methamphetamine (limit of quantitation 50 ng/mL)				
		Positive	Negative	Total
<b>MAMP</b>	Positive	56	0	56
<b>(1000 ng/mL</b>	Negative	2	56	58
<b>Cut-off)</b>	Total	58	56	114

Overall agreement >98% (112/114). Samples having discrepant results were analyzed by GC/MS. The false negative samples contained methamphetamine at 1056 ng/mL and at 1136 ng/mL.

**Sensitivity/Precision**

Performance around the specific cutoff for each drug was evaluated by testing standard drug solutions diluted in drug-free urine in triplicate on 5 different intervals by 3 in-house operators. Drug-free urine was also tested on each interval. The results were interpreted at five minutes.

<b>Amphetamine (d-Amphetamine) Cutoff = 300 ng/mL</b>			
Conc. (ng/mL)	Number Tested	Positive	Negative
0	540	0	540
75	45	0	45
150	45	13	32
225	45	38	7
<b>300</b>	45	44	1
375	45	44	1
450	45	44	1

<b>Barbiturates (Butalbital) Cutoff = 200 ng/mL</b>			
Conc. (ng/mL)	Number Tested	Positive	Negative
Negative	45	0	45
50	45	0	45
100	45	0	45
150	45	12	33
<b>200</b>	45	43	2
250	45	45	0
300	45	45	0

<b>Benzodiazepines (Nordiazepam) Cutoff = 200 ng/mL</b>			
Conc. (ng/mL)	Number Tested	Positive	Negative
Negative	540	0	540
50	45	30	15
100	45	40	5
150	45	45	0
<b>200</b>	45	45	0
250	45	44	1
300	45	45	0

<b>Cocaine (Benzoyllecgonine) Cutoff = 100 ng/mL</b>			
Conc. (ng/mL)	Number Tested	Positive	Negative
Negative	540	0	540
25	45	0	45
50	45	19	26
75	45	25	20
<b>100</b>	45	35	10
125	45	44	1
150	45	41	4

<b>Methamphetamine (d-Methamphetamine) Cutoff = 1000 ng/mL</b>			
Conc. (ng/mL)	Number Tested	Positive	Negative
0	30	0	30
100	30	0	30
250	30	0	30
500	30	26	4
750	30	27	3
<b>1000</b>	30	28	2
1250	30	29	1
1500	30	30	0
2000	30	30	0

<b>Methadone (Methadone) Cutoff = 200 ng/mL</b>			
Conc. (ng/mL)	Number Tested	Positive	Negative
Negative	405	0	405
50	45	4	41
100	45	37	8
150	45	44	1
<b>200</b>	45	45	0
250	45	44	1
300	45	45	0

<b>Opiate (Morphine) Cutoff = 100 ng/mL</b>			
<u>Conc. (ng/mL)</u>	<u>Number Tested</u>	<u>Positive</u>	<u>Negative</u>
Negative	540	0	540
25	45	20	25
50	45	38	7
75	45	44	1
<b>100</b>	45	45	0
125	45	44	1
150	45	43	2

<b>Oxycodone Cutoff = 100 ng/mL</b>			
<u>Conc. (ng/mL)</u>	<u>Number Tested</u>	<u>Positive</u>	<u>Negative</u>
Negative	54	0	54
25	54	0	54
50	54	4	50
75	54	40	14
<b>100</b>	54	50	4
125	54	53	1
150	54	54	0

<b>Phencyclidine (Phencyclidine) Cutoff = 25 ng/mL</b>			
<u>Conc. (ng/mL)</u>	<u>Number Tested</u>	<u>Positive</u>	<u>Negative</u>
Negative	540	0	540
6.25	45	1	44
12.50	45	0	45
18.75	45	17	28
<b>25.00</b>	45	43	2
31.25	45	43	2
37.50	45	44	1

<b>Propoxyphene (Norpropoxyphene) Cutoff = 300 ng/mL</b>			
<u>Conc. (ng/mL)</u>	<u>Number Tested</u>	<u>Positive</u>	<u>Negative</u>
Negative	45	0	45
30	45	0	45
75	45	1	44
150	45	9	36
225	45	16	29
<b>300</b>	45	37	8
375	45	42	3
450	45	44	1
600	45	45	0

<b>Cannabinoids (11-nor-9-carboxy-<math>\Delta</math>-THC) Cutoff = 40 ng/mL</b>			
<u>Conc. (ng/mL)</u>	<u>Number Tested</u>	<u>Positive</u>	<u>Negative</u>
Negative	105	0	105
10	45	0	45
20	45	0	45
30	45	1	44
<b>40</b>	45	45	0
50	45	40	5
60	45	45	0

**Cutoff Characterization (Buprenorphine)**

Performance around the specific cutoff for Buprenorphine was evaluated by testing standard drug solutions diluted in drug-free urine in triplicate by 10 in-house operators. Drug-free urine was also tested by each individual. The results were interpreted at five minutes and shown below:

**MEDTOX<sup>®</sup> Buprenorphine Cutoff Characterization Results**

<u>Concentration of sample (ng/mL)</u>	<u>Number of determinations</u>	<u># Positive</u>	<u># Negative</u>
0	30	0	30
2.5	30	0	30
5.0	30	0	30
7.5	30	9	21
<b>10</b>	30	20	10
12.5	30	29	1
15	30	29	1

**13B. Non Crossreactive Endogenous Compounds**

Listed compounds were initially dissolved in appropriate solvents and then added to drug-free urine for evaluation with all SURE-SCREEN tests. Most of the compounds were evaluated for reactivity with the SURE-SCREEN tests at 100  $\mu$ g/mL (albumin was evaluated at 20 mg/mL and bilirubin was evaluated at 200  $\mu$ g/mL). Samples were evaluated in triplicate by in-house operators. The listed compounds gave negative results with all of the SURE-SCREEN tests.

- |                |                       |                     |
|----------------|-----------------------|---------------------|
| Acetaldehyde   | Creatinine            | Hemoglobin, Human   |
| Acetone        | Epinephrine           | Sodium Chloride     |
| Albumin, Human | $\beta$ -Estradiol    | Tetrahydrocortisone |
| Bilirubin      | Estriol               | d,1-Thyroxine       |
| Cholesterol    | Glucose Std. Solution | Uric Acid           |

### 13C. Unrelated Compounds, Prescription and Over-the-Counter Medications

The following compounds were tested for reactivity to the SURE-SCREEN Drugs of Abuse Test System. Listed compounds were dissolved in appropriate solvents and then added to drug-free urine for testing. Samples were evaluated in triplicate by in-house operators. Unless otherwise noted by a drug name abbreviation such as "AMP" or "BAR" etc., all of the listed compounds were negative in each of the tests at 100 µg/mL or the highest level tested. (Alprazolam, 1-hydroxy; Buprenorphine, Fentanyl, Lorazepam glucuronide, 11-Nor-9-carboxy- $\Delta^9$ -THC, Olanzapine, and Oxazepam glucuronide were evaluated at 10µg/mL. 11-Nor-9-carboxy- $\Delta^9$ -THC was evaluated at 5 µg/mL). If a drug name is followed by an abbreviation such as "AMP" or "BAR" etc., check the "Related Compounds and Cross Reactants" listing for the drug in question under the appropriate heading (AMP, BAR, etc.) to find its level of cross-reactivity to that test.

Acecinide (N-Acetylprocainamide)	Acetaminophen	Acetylsalicylic Acid	Allobarbitol-BAR	Alphenal-BAR	Alprazolam-BZO
Alprazolam, 1-Hydroxy-BZO	p-Aminobenzoic Acid	7-Amino-clonazepam	7-Amino-flunitrazepam	Aminoglutethimide	l-Aminopyrine (4-(dimethylamino) antipyrine)
Amitriptyline	Amobarbital-BAR	Amoxapine	Amoxicillin	d-Amphetamine-AMP	l-Amphetamine-AMP
Ampicillin	Apomorphine	l-Ascorbic Acid	Aspartame	Atenolol	Atropine Sulfate
Barbital-BAR	Barbituric Acid	Benzilic Acid	Benzoic Acid	Benzocaine (ethyl-4-aminobenzoate)	Benzoylcegonine-COC
Benzphetamine	Benztropine	Brompheniramine	Buprenorphine-BUP	Bupropion	Butabarbital-BAR
Butalbital-BAR	Caffeine	Cannabidiol	Cannabinol	Captopril	Carbamazepine
Carbamazepine-10,11 epoxide	Carisoprodol (Meprobamate)	Cephalexin	Chloral Hydrate	Chloramphenicol	Chlordiazepoxide-BZO
Chloroquine	Chlorothiazide	Chlorpheniramine	Chlorpromazine	Chlorprothixene	Clobazam-BZO
Clonipramine	Clonazepam-BZO	Clonidine	Clorazepate-BZO	Clozapine	Cocaine-COC
Codeine-OPI, OXY	Cortisone	Cotinine	Cyclobenzaprine	Cyclopentobarbital-BAR	Deoxycorticosterone
Desalkylflurazepam-BZO	Desipramine	Desmethylchlordiazepoxide (Norchlordiazepoxide)-BZO	Desmethylflunitrazepam-BZO	Desmethylvenlafaxine	Dexamethasone
Dextromethorphan	Diacetylmorphine-OPI	Diazepam-BZO	Diclofenac	Diethylpropion	Diflunisal
Digoxin	Dihydrocodeine-OPI, OXY	Dimenhydrinate (Dramamine)	1,3-Dimethylbarbituric acid	Diphenhydramine	Domperidone
Dopamine	Doxepin	Doxylamine	Ecgonine	Ecgonine Methyl Ester	EDDP (Primary metabolite of methadone)
Efavirenz (Sustiva)	EMDP (Secondary metabolite of methadone)-OXY	Ephedrine-MAMP	Equilin	Erythromycin	Estrone
Ethanol	Ethylmorphine-OPI, OXY	Fenfluramine-MAMP	Fenoprofen	Fentanyl (Synthetic opiate)	Flunitrazepam-BZO
Fluoxetine (Prozac)	Flurazepam	Furosemide	Fluvoxamine	Gentisic Acid (2,5-Dihydroxybenzoic acid)	Glutethimide
Guaiaicol Glyceryl Ether	Haloperidol	Hexobarbital	Hippuric acid	Hydralazine	Hydrochlorothiazide
Hydrocodone-OPI, OXY	Hydrocortisone	Hydromorphone-OPI, OXY	Hydroxybupropion	Hydroxyhippuric acid	l-11-Hydroxy- $\Delta^9$ -THC-THC
p-Hydroxyphenobarbital-BAR	4-Hydroxyphenacyclidine-PCP	3-Hydroxytyramine	Hydroxyzine	Ibuprofen	Imipramine
Iproniazid	(R)-Isoproterenol	Isoxsuprine	Ketamine	Ketoprofen	Labetalol
Levorphanol-OPI	Lidocaine	Lithium carbonate	Loperamide	Lorazepam-BZO	Lorazepam glucuronide-BZO
Loxapine	Lysergic Acid-BZO	Lysergic Acid Diethylamide (LSD)	Maprotiline	MDA-AMP	MDE (MDEA)-MAMP
MDMA-MAMP	Melanin	Meperidine	Mephobarbital	Mepivacaine	Mesoridazine
Methadone-MTD	d-Methamphetamine-MAMP	l-Methamphetamine-MAMP	Methaqualone	Methcathinone	Methocarbamol
Methoxyphenamine	Methylphenidate	Methylprylon	Metoprolol	Midazolam-BZO	Mirtazapine
6-Monoacetylmorphine-OPI	Morphine-OPI, OXY	Morphine 3- $\beta$ -D-Glucuronide-OPI	Morphine 6- $\beta$ -D-Glucuronide	Nalidixic Acid	Naltrexone-OXY
Nalorphine-OPI	Naloxone-OPI, OXY	Naproxen	Niacinamide	Nicotine	Nifedipine
Nitrazepam-BZO	Nitrofurantoin	Norclonipramine	Norcodeine-OXY	Nordiazepam-BZO	Nordoxepin
Norethindrone	Norlysergic Acid	Normeperidine	Norpropoxyphene-PPX	l-Norpseudoephedrine	11-Nor-9-carboxy- $\Delta^9$ -THC-THC
11-Nor-9-carboxy- $\Delta^9$ -THC-THC	Nortriptyline	Noscapine	Nylidrin	Octopamine	Ofloxacin-OPI
Olanzapine (Zyprexa)-TCA positive-Anti-Psychotic	Omeprazole	Orphenadrine	Oxalic Acid	Oxaprosin	Oxazepam-BZO
Oxazepam glucuronide-BZO	Oxolinic Acid	Oxycodone-OPI, OXY	Oxymetazoline	Oxymorphone-OPI, OXY	Papaverine hydrochloride
Pentazocine	Pentobarbital-BAR	Perphenazine	Phenacetin (Acetophenetidin)	Phencyclidine-PCP	
Phendimetrazine	Phenelzine	Phenethylamine-MAMP	Pheniramine	Phenmetrazine	Phenobarbital-BAR
Phenothiazine	Phentermine-AMP	Phenytoin (Diphenylhydantoin)-BAR	Phenylbutazone	Phenylephrine-MAMP	Phenylpropanolamine
Piroxicam	Prazosin	Prednisolone	Prednisone	Procaine-MAMP	Procainamide
Prochlorperazine	Promazine	Promethazine	Propoxyphene-PPX	Propranolol	Protriptyline
Pseudoephedrine	Pyrilamine	Quetiapine (Seroquel)-TCA positive-Anti-Psychotic	Quinidine	Ranitidine	Riboflavin
Rifampin	Salicylic Acid	Secobarbital-BAR	Selegiline (Deprenyl)	Serotonin (5-Hydroxytryptamine)	Sertraline (Zoloft)
Sildenafil (Viagra)	Sulfamethazine	Sulindac	Talbutal-BAR	Temazepam-BZO	Temazepam glucuronide-BZO
Tetracycline	$\Delta^9$ -Tetrahydrocannabinol-THC	$\Delta^8$ -Tetrahydrocannabinol-( $\Delta^6$ -Tetrahydrocannabinol)-THC	Tetrahydrozoline	Thebaine-OPI	
Theophylline	Thiamine	Thiopental	Thioridazine	Thiothixene	Tolbutamide

Tolmetin (Tolectin)	Trazodone	Triamterene	Triazolam- <b>BZO</b>	Triazolam, 1-hydroxy	Trifluoperazine
Trimethoprim	Trimipramine	Tripelennamine	Tryptamine	Tryptophan	Tyramine
Tyrosine	Valproic Acid	Venlafaxine	Verapamil	Zomepirac	

### 13D. Related and Reactive Compounds

The following metabolites and reacting compounds were evaluated for the specified test on the SURE-SCREEN Drugs of Abuse Test System. Reference standards for the various metabolites and compounds were prepared in negative urine samples. Results are expressed as the minimum concentration expected to produce a positive result in the indicated assay. Compounds that reacted with the test are listed first, and related compounds that did not react with the highest concentration tested are listed second as Negative at 100,000 ng/mL (or highest level tested).

<b>Amphetamines- (AMP)</b> (d-Amphetamine) 300 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
I-Amphetamine	Positive at 100,000 ng/mL	<1%
MDA	Positive at 750ng/mL	40%
Phentermine	Positive at 1,000 ng/mL	30%
Ephedrine	Negative at 100,000 ng/mL	None Detected
MDE (MDEA)	Negative at 100,000 ng/mL	None Detected
MDMA	Negative at 100,000 ng/mL	None Detected
l-Methamphetamine	Negative at 100,000 ng/mL	None Detected
d-Methamphetamine	Negative at 100,000 ng/mL	None Detected
Phenethylamine	Negative at 100,000 ng/mL	None Detected
Tyramine	Negative at 100,000 ng/mL	None Detected

<b>Barbiturate-(BAR)</b> (Butalbital) 200 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
Allobarbitol	Positive at 500 ng/mL	40%
Alphenal	Positive at 100 ng/mL	200%
Amobarbitol	Positive at 2,500 ng/mL	8%
Barbitol	Positive at 2,500 ng/mL	8%
Butabarbitol	Positive at 750 ng/mL	27%
Cyclopentobarbitol	Positive at 250 ng/mL	80%
p-Hydroxyphenobarbitol	Positive at 500 ng/mL	40%
Pentobarbitol	Positive at 500 ng/mL	40%
Phenobarbitol	Positive at 800 ng/mL	25%
Phenytoin (Diphenylhydantoin)	Positive at 2,500 ng/mL	8%
Secobarbitol	Positive at 75 ng/mL	267%
Talbutal	Positive at 50 ng/mL	400%
Amino glutethimide	Negative at 100,000 ng/mL	None Detected
Barbituric Acid	Negative at 100,000 ng/mL	None Detected
1,3 Dimethylbarbituric Acid	Negative at 100,000 ng/mL	None Detected
Glutethimide	Negative at 100,000 ng/mL	None Detected
Hexobarbitol	Negative at 100,000 ng/mL	None Detected
Mephobarbitol	Negative at 100,000 ng/mL	None Detected

<b>Buprenorphine-(BUP)</b> (Buprenorphine) 10ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
Buprenorphine-glucuronide	Positive at 7.5 ng/mL	133%
Norbuprenorphine	Positive at 50 ng/mL	20%
Norbuprenorphine-glucuronide	Positive at 50 ng/mL	20%
Codeine	Negative at 100,000 ng/mL	None Detected
Diacetylmorphine	Negative at 100,000 ng/mL	None Detected
Hydrocodone	Negative at 100,000 ng/mL	None Detected
Hydromorphone	Negative at 100,000 ng/mL	None Detected
Levorphanol	Negative at 100,000 ng/mL	None Detected
6-Monoacetylmorphine	Negative at 100,000 ng/mL	None Detected
Morphine	Negative at 100,000 ng/mL	None Detected
Naloxone	Negative at 100,000 ng/mL	None Detected
Naltrexone	Negative at 100,000 ng/mL	None Detected
Oxycodone	Negative at 100,000 ng/mL	None Detected
Oxymorphone	Negative at 100,000 ng/mL	None Detected
Thebaine	Negative at 100,000 ng/mL	None Detected

<b>Benzodiazepine-(BZO)</b> (Nordiazepam) 200 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
Alprazolam	Positive at 100 ng/mL	200%
Alprazolam, 1-OH	Positive at 1000 ng/mL	20%
Chlordiazepoxide	Positive at 25,000 ng/mL	<1%
Clobazam	Positive at 75 ng/mL	267%
Clonazepam	Positive at 500 ng/mL	40%
Clorazepate	Positive at 250 ng/mL	80%
Desalkylflurazepam	Positive at 250 ng/mL	80%
Desmethylchlordiazepoxide	Positive at 2500 ng/mL	8%
Desmethylflunitrazepam	Positive at 250 ng/mL	80%
Diazepam	Positive at 250 ng/mL	80%
Flunitrazepam	Positive at 250 ng/mL	80%
Lorazepam	Positive at 2,500 ng/mL	8%
Lorazepam glucuronide	Positive at 500 ng/mL	40%
Lysergic acid	Positive at 25,000 ng/mL	<1%
Midazolam	Positive at 1,000 ng/mL	20%
Nitrazepam	Positive at 100 ng/mL	200%
Oxazepam	Positive at 250 ng/mL	80%
Oxazepam glucuronide	Positive at 100 ng/mL	200%
Temazepam	Positive at 250 ng/mL	80%
Temazepam glucuronide	Positive at 250 ng/mL	80%
Triazolam	Positive at 500 ng/mL	40%

7-Aminoclonazepam	Negative at 100,000 ng/mL	None Detected
7-Aminoflunitrazepam	Negative at 100,000 ng/mL	None Detected
Flurazepam	Negative at 100,000 ng/mL	None Detected
Pyrilamine	Negative at 100,000 ng/mL	None Detected
Sildenafil	Negative at 100,000 ng/mL	None Detected
Sulindac	Negative at 100,000 ng/mL	None Detected
Triazolam, 1-OH	Negative at 100,000 ng/mL	None Detected

<b>Cocaine-(COC)</b> (Benzoylcegonine) 100 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
Cocaine	Positive at 300 ng/mL	33%
Ecgonine	Negative at 100,000 ng/mL	None Detected
Ecgonine Methyl Ester	Negative at 100,000 ng/mL	None Detected

<b>Methamphetamine-(MAMP)</b> (dMethamphetamine) 1000 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
Ephedrine	Positive at 2,500 ng/mL	40%
Fenfluramine	Positive at 25,000 ng/mL	4%
MDE (MDEA)	Positive at 5,000 ng/mL	20%
MDMA	Positive at 1,500 ng/mL	67%
l-Methamphetamine	Positive at 7,500 ng/mL	13%
Phenethylamine	Positive at 5,000 ng/mL	20%
Phenylephrine	Positive at 50,000 ng/mL	<1%
Procaine	Positive at 10,000 ng/mL	1%
d-Amphetamine	Negative at 100,000 ng/mL	None Detected
l-Amphetamine	Negative at 100,000 ng/mL	None Detected
MDA	Negative at 100,000 ng/mL	None Detected
Phentermine	Negative at 100,000 ng/mL	None Detected
Pseudoephedrine	Negative at 100,000 ng/mL	None Detected
Tyramine	Negative at 100,000 ng/mL	None Detected

<b>Methadone-(MTD)</b> (Methadone) 200 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
EDDP (Primary metabolite)	Negative at 100,000 ng/mL	None Detected
EMDP (Secondary metabolite)	Negative at 100,000 ng/mL	None Detected

<b>Opiates-(OPI)</b> (Morphine) 100 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
Codeine	Positive at 300 ng/mL	33%
Diacetylmorphine	Positive at 300 ng/mL	33%
Dihydrocodeine	Positive at 100 ng/mL	100%
Ethylmorphine	Positive at 50 ng/mL	200%
Hydrocodone	Positive at 300 ng/mL	33%
Hydromorphone	Positive at 100 ng/mL	100%
Levorphanol	Positive at 50,000 ng/mL	<1%
6-Monoacetylmorphine	Positive at 100,000 ng/mL	<1%
Morphine 3-β-D-Glucuronide	Positive at 100,000 ng/mL	<1%
Nalorphine	Positive at 150 ng/mL	67%
Naloxone	Positive at 25,000 ng/mL	<1%
Ofloxacin	Positive at 5,000 ng/mL	2%
Oxycodone	Positive at 50,000 ng/mL	<1%
Oxymorphone	Positive at 75,000 ng/mL	<1%
Thebaine	Positive at 1,000 ng/mL	10%
Apomorphine	Negative at 100,000 ng/mL	None Detected
Morphine 6-β-D-Glucuronide	Negative at 100,000 ng/mL	None Detected
Naltrexone	Negative at 100,000 ng/mL	None Detected
Norcodeine	Negative at 100,000 ng/mL	None Detected

<b>Oxycodone-(OXY)</b> (Oxycodone) 100 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
Codeine	Positive at 2,500 ng/mL	4%
Dihydrocodeine	Positive at 2,500 ng/mL	4%
Ethylmorphine	Positive at 2,500 ng/mL	4%
Hydrocodone	Positive at 10,000 ng/mL	1%
Hydromorphone	Positive at 10,000 ng/mL	1%
Morphine	Positive at 5,000 ng/mL	2%
Naloxone	Positive at 10,000 ng/mL	<1%
Naltrexone	Positive at 25,000 ng/mL	<1%
Norcodeine	Positive at 50,000 ng/mL	<1%
Oxymorphone	Positive at 200 ng/mL	50%
Apomorphine	Negative at 100,000 ng/mL	None Detected
Diacetylmorphine	Negative at 100,000 ng/mL	None Detected
Levorphanol	Negative at 50,000 ng/mL	None Detected
6-Monoacetylmorphine	Negative at 100,000 ng/mL	None Detected
Morphine 3-β-D-Glucuronide	Negative at 100,000 ng/mL	None Detected
Morphine 6-β-D-Glucuronide	Negative at 100,000 ng/mL	None Detected
Nalorphine	Negative at 100,000 ng/mL	None Detected
Thebaine	Negative at 100,000 ng/mL	None Detected

<b>Phencyclidine-(PCP)</b> (Phencyclidine) 25 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
4-Hydroxyphencyclidine	Positive at 5,000 ng/mL	<1%

<b>Propoxyphene-(PPX)</b> (Norpropoxyphene) 300 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
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Propoxyphene	Positive at 50 ng/mL	600%
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<b>Cannabinoids-(THC)</b> (11-Nor-9-carboxy- $\Delta^9$ -THC) 40 ng/mL	<b>Result</b>	<b>% Cross-Reactive</b>
L-11-Hydroxy- $\Delta^9$ -THC	Positive at 250 ng/mL	16%
11-Nor-9-carboxy- $\Delta^8$ -THC	Positive at 1,000 ng/mL	4%
$\Delta^9$ -Tetrahydrocannabinol	Positive at 10,000 ng/mL	<1%
$\Delta^8$ -Tetrahydrocannabinol ( $\Delta^6$ -Tetrahydrocannabinol)	Positive at 25,000 ng/mL	<1%
Cannabidiol	Negative at 100,000 ng/mL	None Detected
Cannabinol	Negative at 100,000 ng/mL	None Detected

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#### 15. LIMITED EXPRESS WARRANTIES

The manufacturer makes no express warranty other than the diagnostic test kit will measure certain drugs and/or drug metabolites when used in accordance with the manufacturer's printed instructions. The use of the kit for any other purpose is outside the intended use of this product. The manufacturer gives no express warranty as to what the legal or clinical significance of the level of drug/drug metabolites detected by the SURE-SCREEN test. The manufacturer disclaims any and all implied warranties of merchantability, fitness for use or implied utility for any other purposes. Any and all damages for failure of the kit to perform to its instructions are limited to the replacement value of the kit.

Covered by one or more patents.

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